6. SELECTION OF ALTERNATIVES FOR DETAILED ANALYSIS

6.1 INTRODUCTION

A Biological Opinion (BiOp) was completed by the U.S. Fish and Wildlife Service (USFWS), as required by Section 7 of the Endangered Species Act (ESA), in November 2000. The BiOp included a Reasonable and Prudent Alternative (RPA) composed of the following four elements:

- Adaptive management
- Flow enhancement at Gavins Point and Fort Peck Dams
- Unbalanced intrasystem regulation
- Habitat restoration/creation/acquisition

The second and third of these four elements relate directly to the operation of the Mainstem Reservoir System, and the first would be used to modify the operation to meet the identified needs of the three listed species affected by the operation of the system. The last element can be accomplished independently from selecting and implementing a Water Control Plan; however, the amount of habitat to be restored, created, or acquired is slightly dependent on the water control plan selected.

Following receipt of the BiOp, the Corps began to formulate alternatives for detailed presentation in this Revised Draft Environmental Impact (RDEIS). During this period, feedback was received from a wide array of interests regarding the RPA and how the Corps should proceed. To facilitate the direction the Corps should take, the Northwestern Division (NWD) of the Corps established three goals that the alternatives would need to meet in order to be presented in the RDEIS. These goals are as follows:

- The alternative should serve Congressionally authorized project purposes.
- The alternative should meet the contemporary needs of the basin as defined by the basin.
- The alternatives must not jeopardize the continued existence of threatened and endangered species.

Based on the Corps' operation of the system, knowledge of its mission and responsibilities, and input received from basin stakeholders throughout the process, the Corps felt confident that alternatives that met the first two objectives could be developed fairly easily. The RPA in the BiOp added considerably to the complexity of developing plans that could meet these two goals plus the third goal. Through compromise among the plans submitted for consideration (see Chapters 4 and 5), the Corps believed that alternatives that contained some flow modifications for threatened and endangered species, but that did not substantially affect the other two objectives, could be developed.

An additional goal of having a revised Water Control Plan implemented by 2003 was included as part of the flow enhancement element of the RPA in the BiOp. This goal can be met within the schedule the Corps is working under to complete the National Environmental Policy Act (NEPA) process for the Master Manual and subsequent steps leading toward implementation of a revised Water Control Plan.

Chapter 6 describes the process leading to development of the five alternatives to the current Water Control Plan (CWCP) that are analyzed in detail in Chapter 7 of this RDEIS. This chapter also describes the features of these alternative plans. These alternatives include a modified conservation plan (MCP), which also incorporates flow modifications at Fort Peck Dam, and four alternatives that add various Gavins Point Dam release changes to the MCP. These latter four alternative plans, referred to as the GP options, address changes in water releases from Gavins Point Dam that the USFWS recommended as part of the RPA in its BiOp.

The Corps set the level of analysis for the alternatives presented in Chapter 7 of this RDEIS such that should any of those alternatives be identified as the selected plan in a Final Environmental Impact Statement (FEIS), the Corps could proceed to implementation of the alternative. Additional steps along the way towards implementation require that the Corps complete a Record of Decision (ROD), revise the existing manual, and develop an Annual Operating Plan (AOP) in conformance with the revised manual. Once all of these steps are completed, the Corps can proceed to implement the alternative without further review under NEPA.

Under the adaptive management process included in the BiOp RPA, the Corps would work with the USFWS through the Agency Coordination Team

(ACT), basin interests, the Tribes, and State and Federal agencies to determine if changes should be made to the Water Control Plan. If the data collection and analysis, the ACT, and the various entities involved in the adaptive management process support the need for a change, the Corps could elect to implement any of the alternatives included in Chapter 7. Furthermore, the MCP and the GP options cover a range of operations at Gavins Point Dam, and the Corps could implement a Water Control Plan that incorporates releases that fall within this range evaluated in the RDEIS without further NEPA documentation. The next AOP would need to reflect the changed operations before the new Water Control Plan could be implemented. Public input would be required during the adaptive management and subsequent AOP preparation processes. Chapter 6 devotes a significant amount of discussion to the adaptive management process and how it may be integrated into the future operations of the Mainstem Reservoir System.

Chapter 6 also includes a discussion of activities that have occurred and issues that have arisen following receipt of the Final BiOp. While these activities are not directly related to the Corps' formulation of alternatives, these activities have affected the analysis of the alternatives presented in Chapter 7.

6.2 FORMULATION OF THE ALTERNATIVES FOR DETAILED PRESENTATION

As the Corps embarked on its efforts to identify a preferred alternative for the RDEIS, it was apparent that considerable controversy would surface if this alternative were the BiOp RPA. Decisions to move away from controlled releases in the spring through the summer toward operation under a modified flow pattern to benefit endangered species are viewed by many as being unsatisfactory. Current operations with their controlled releases were serving the authorized project purposes in a generally satisfactory manner. Any movement toward a flow pattern that mimicked the pre-system hydrograph (spring rise followed by much lower summer flows) on any river reach would heighten the controversy that had been out of the spotlight in the last few years. If acceptance of a Water Control Plan were to occur, the various basin interests would have to reach some form of compromise. By far the more controversial of the two modifications specified in the BiOp RPA was the Gavins Point Dam release modification.

It became readily apparent that the Corps needed to share additional information with the Tribes, basin stakeholders, interested members of the public, and State and Federal agencies on a potential array of alternatives that addressed the need to purposefully move toward the modified annual hydrograph as part of system operations. The public needed to be fully informed on the tradeoffs associated with an array of flow changes. Thus, five alternatives were formulated to provide such an array, four with various levels of the flow modification mimicking the historic hydrograph at Gavins Point Dam. These five plans include a modified conservation plan and four Gavins Point Dam release alternatives.

The first plan includes three basic plan components (two from the BiOp RPA) that were changed from those making up the CWCP. These changed components include increased drought conservation measures like those included in the MRBA alternative (see Chapters 4 and 5), unbalanced storage among the three upper and largest lakes in the Mainstem Reservoir System (RPA element), and a Fort Peck spring rise approximately every third year (when conditions allow) (RPA element). Because the most dominant factor in this alternative is the modified drought conservation measures, this plan is referred to as the modified conservation plan, or the MCP.

The other four alternatives include another BiOp RPA element: changes to releases from Gavins Point Dam. These changes include increased spring releases (a spring rise) and lower summer releases that result in lower summer flows on the Lower River. The USFWS has recommended that the spring rise occur on an average of once every third year and that lower summer releases occur every year, conditions permitting. Because these four alternatives have modified Gavins Point Dam releases, they are called the GP options. Their specific naming convention has six characters: GP followed by two numerals representing the amount of the spring rise in kcfs followed by two numerals representing the amount of the summer low-flow release from Gavins Point Dam. For example, the GP1528 option includes a 15-kcfs spring rise release above that normally required for full service to navigation (modeled as running for 4 weeks from mid-May to mid-June followed by a minimum service flat release (modeled as 28.5 kcfs) that ends on September 1. Similarly, the GP2021 option has

a 20-kcfs spring rise followed by a 25-kcfs release to mid-July when the release drops to a low of 21 kcfs until mid-August, when it returns to 25 kcfs until September 1. The GP1528 option represents a potential starting point option for the Gavins Point Dam release changes because it has the smallest changes of the four options from the releases of the CWCP in the spring and summer (34.5-kcfs flat release). The other two options included in this chapter are GP1521 and GP2028. These two options were included to provide a perspective for what would happen if the summer low-flow release were further reduced without changing the spring rise (GP1521) and if the spring rise were further increased without changing the summer low-flow release (GP2028).

Under the GP options, Gavins Point Dam spring rise is attempted every year. Two factors were allowed to limit the years in which spring rises would occur. First, Gavins Point Dam releases to the Lower River are limited when flood control constraints (see Chapter 2) are exceeded at three locations (Omaha, Nebraska City, and Kansas City). When the lower of two sets of flood control constraint target flow values is exceeded, the releases from Gavins Point Dam are cut back. The cut-back is designed to limit flows to the full navigation target flow value or the flood control constraint target value, whichever change requires the smallest release reductions at Gavins Point Dam. If one of the three target flow values is exceeded in the higher set, releases from Gavins Point Dam are further cut back such that the flow at Sioux City is equal to the minimum navigation service target value. The spring rise would be abandoned at least until downstream flows were below the constraining flow values at the three downstream target locations. In many years, the flows at one or more of the three flood control constraint target locations are exceeded, and a spring rise is not accomplished. To ensure that a spring rise occurs in approximately one-third of the years, the flood control constraints are generally increased by an amount equal to the desired spring rise value. In the case of the GP1528 option, the spring rise is 15 kcfs and the flood control constraints would be raised by 15 kcfs. Generally, releases from Gavins Point Dam are limited in the same years whether the Water Control Plan is the CWCP, the MCP, or one of the GP options with the increased flood control constraints.

The water in system storage is unbalanced in "normal" years. In years when there is water high in the flood control storage zones of the system, this excess water is distributed on a somewhat equal basis among the upper three lakes. Similarly, when the basin is in the second year of an extended drought (greater than 1-year drought), the empty storage space is distributed on a somewhat equal basis among the upper three lakes. In those years in which there is not an excessive amount or a shortfall of water in storage, a 3-year cycle is followed for lowering the water level about 3 feet below normal the first year, followed by a refill of the lake to about 3 feet above normal the second year and declining lake levees (a "float" year) the third year. This process of unbalancing the storage affects the water levels in Fort Peck Lake, Lake Sakakawea, and Lake Oahe. The endangered species inhabiting the reaches between the three lakes benefit from this procedure as high flows are good for the native river fish and for clearing vegetation from the islands and sandbars and the subsequent low flows maximize the amount of clear sand that is exposed. The fishery in the lakes benefits as the perimeters of the lakes provide a place for vegetation to grow, which becomes spawning habitat and hiding habitat for the young-of-year fish after hatching. The bare sand around the lakes also provides habitat for the nesting of the two listed birds, the least tern and piping plover.

As part of the unbalancing cycle, the release from Fort Peck Dam would be set in the 20- to 25-kcfs range (modeled as 23 kcfs) to provide a spawning cue for native river fish, including the endangered pallid sturgeon. This spring rise would occur in the drawdown years for the lowering of Fort Peck Lake in the 3-year unbalancing of system storage described above. Part of that spring rise would be released over the spillway to allow the mixing of warmer water from the surface of the lake with the water from the powerhouse, which comes from the colder lower levels of the lake. Because water has to be several feet above the spillway crest, this operation could not occur when the lake is several feet below normal levels as it may well be in lower inflow years.

The reduced (from full navigation service levels) Gavins Point releases in the summer are made every year in which excessive water in flood control storage does not have to be evacuated. The summer release for the GP1528 and GP2028 options is modeled as a flat 28.5 kcfs release from about June 20 to September 1. This release is 6 kcfs less than modeled for the CWCP or MCP, which provide full navigation service in a majority of the

years. In reality, the release would vary somewhat from year to year as the anticipated inflows from the tributaries along the Lower River are taken into account. In some years, even higher flows may be needed. In these years, the amount of water being stored in the two flood control zones of the system needs to be evacuated in the summer months as well as the period after September 1 to limit purposeful flooding of facilities and lands along the river in the post-September 1 period. In these years, the flat, low-flow release would need to be abandoned for a higher release. In reality, a projection of the evacuation need would be made about July 1, and downstream target flows would be set at some value to meet flood storage evacuation needs throughout the flat release period of about June 20 to September 1.

The Corps believes the GP options represent a reasonable compromise for the operation of the Mainstem Reservoir System. Throughout the Study, the Corps has made every effort to promote development of flow management plans that have broad basin support. The Corps believes that this effort has been largely successful. Although the areas of conflict are numerous and complex, the Missouri River basin has made historic progress in resolving many issues. With the goals above as the foundation, the Corps has made every effort to formulate alternatives that reflect the basin's constituents' desire to compromise on a Water Control Plan for the Mainstem Reservoir System.

Even though adaptive management is not required to arrive at a Water Control Plan for the Mainstem Reservoir System, it is important to understand the relationship between adaptive management and the Water Control Plan that may be selected as part of the NEPA process for the Study. Adaptive management is an overall strategy for dealing with change and scientific uncertainty. This strategy promotes an environment for testing hypotheses and exploring promising changes based on sound scientific data and analyses. Monitoring and evaluation of actual results of changes in the operation of the Mainstem Reservoir System and the flexibility to adapt as new information becomes available are the key elements of the strategy. All of the alternatives presented in detail in Chapter 7 accommodate an adaptive management strategy.

An Agency Coordination Team (ACT), made up primarily of Federal biologists, has been established to facilitate the adaptive management approach to Mainstem Reservoir System operation. It will review and evaluate monitoring data on system operations as it determines if operational changes are needed for the benefit of threatened and endangered species. If it finds that operational changes are necessary, it will make a recommendation to the Corps for those changes. Basin stakeholder participation with the ACT is currently being discussed. The MRBA has taken the lead in exploring a broader adaptive management concept that would involve stakeholder participation in recovery of endangered species and restoration of the Missouri River ecosystem. Further, at the request of the Corps and the U.S. Environmental Protection Agency (EPA), the National Academy of Science (NAS) is completing a study that explores adaptive management strategies for the Missouri River and identifies gaps in Missouri River science. A report will be completed by the NAS in fall 2001 that should assist in shaping an adaptive management strategy for the basin.

Selecting the alternatives for detailed analysis in the RDEIS with an objective of receiving public input was not easily accomplished. In light of the new information provided in the BiOp, the Corps asked the basin interests who had previously submitted recommendations (see Chapter 4) if they would like to revise their recommendations. The basin interests elected not to revise their recommendations; however, the MRBA indicated that it might consider revising its recommendations after it had an opportunity to review this RDEIS. Had the Corps received revised recommendations from basin interests, the alternatives, in particular the potential starting point for the GP options (GP1528) may have been different. Since the Corps did not receive further guidance from the basin, the Corps proceeded to develop alternatives that the Corps believes to some degree achieve the three goals identified above, build upon basin consensus, and embrace the concept of adaptive management.

Additional discussion continued between the Corps and the USFWS as the selection of alternatives to include in the RDEIS became imminent. The purpose of the discussions was to ensure that the both the Corps and the USFWS had an accurate understanding of all the elements of the RPA included in the BiOp. Also, the Corps wanted to ensure it was proceeding to develop some alternatives that the USFWS and the ACT could support as not jeopardizing the continued existence of the three listed species.

The selection of the alternatives was assisted by feedback provided by the ACT. At its initial meeting in March 2001, the ACT agreed that flows high enough to support minimum service to navigation may be acceptable as long as the tern and plover fledge ratios and population levels of both species remained within an acceptable range. If one of the factors were to decline below acceptable levels, the ACT would request that the prescribed summer release pattern from Gavins Point Dam be followed in the next AOP.

The ACT also provided some feedback relative to the Gavins Point Dam increase in spring releases. The BiOp RPA identifies a starting point of 17.5 kcfs above full service navigation releases once every 3 years on average. In the BiOp, however, the USFWS identifies a range of releases from 15 to 20 kcfs above full service navigation. After considering its flood control responsibilities and the potential increased risk of downstream crop damages resulting from interior drainage and groundwater impacts, the Corps determined that a more reasonable potential starting point for the spring rise release was 15 kcfs above that necessary for full service navigation. Consistent with the concept of adaptive management, the two options for spring rise increases were incorporated into the GP options.

Arriving at a basin consensus on any of the four GP options would represent a great accomplishment, if not the greatest accomplishment, ever made regarding the Missouri River since the Mainstem Reservoir System was authorized and built. If that does not take place, just getting basin consensus on the MCP would be a major step forward for basin unity on the Missouri River operations. Getting to the point of completing the RDEIS with its MCP and four GP options has been extremely difficult. These alternatives represent years of disagreement followed by some movement towards a better understanding of the tradeoffs associated with changes and basin consensus on many Missouri River issues.

6.3 FEATURES OF THE MODIFIED CONSERVATION PLAN (MCP)

6.3.1 Adaptive Management

As discussed above, the Corps has adopted the concept of adaptive management. An overall adaptive management strategy would be applied to the MCP.

6.3.2 Drought Conservation Measures

The MCP includes drought conservation criteria that would result in a minimum storage level in the 1987 to 1993 drought of approximately 43 MAF. This was accomplished by making more stringent cuts to navigation earlier in droughts while eliminating back-to-back minimum service years for navigation, which were identified by the navigation industry as potentially eliminating navigation on the river in the future. Thus, to accomplish a change in operations during drought that is both beneficial and detrimental to those who view themselves as being adversely affected, the Corps hoped to get some buy-in to the change by the navigation industry. To provide some perspective, had the CWCP (see Chapter 2 for a detailed description of the CWCP) been strictly followed during the 1987 to 1993 drought, minimum storage would have been 40 MAF. Some adjustments were made during this drought, however, that resulted in a minimum storage of about 41 MAF.

The MCP navigation criteria consist of navigation trigger points (storage levels) of 54.5 MAF of water in storage on March 15 and 59.0 MAF on July 1. If the amount of water in system storage were at or below those levels on those dates, navigation service would be cut from the full service level and an 8-month season. Instead, an intermediate service level 3 kcfs less than full service (and 3 kcfs more than minimum service) and a season length of 7.1 months (7 months and 3 days) would be followed in that year. A second navigation criterion would be checked on July 1. If there were no storage gain between March 15 and July 1, navigation support releases would be further cut to minimum service (6 kcfs less than full service). This minimum service level would be provided for the remainder of that 7.1-month season and for the period from April 1 through August 20 of the next season. The service level could not be increased to the intermediate level on July 1 of the second season because terns and plovers would still be located on islands in the Fort Randall and Gavins Point Dam reaches until about August 20. This second, more stringent navigation criteria would occur primarily in the more severe drought years (about 8 years in the 100-year period modeled).

One other navigation criterion is included in the MCP alternative. To limit drawdown of the lakes during the more severe droughts (like the 1930 to 1941 drought), the MCP specifies a storage level

that precludes navigation. If the amount of water in storage on March 15 is less than 31 MAF, there will be no navigation season that year. In the computer simulation, this criterion resulted in a minimum storage level of about 27 kcfs in the 1930 to 1941 drought, which is about 7 MAF higher than the CWCP (19 MAF minimum) provided.

6.3.3 Intrasystem Unbalancing

Intrasystem unbalancing on a 3-year cycle, as described above, is a component of the MCP. The BiOp RPA recommends unbalancing the amount of water in these lakes as long as an extended drought (more than 1 year long) or extremely high runoff into the system is not occurring. When system inflows are very much above or below normal, the amount of water in the upper three (largest) lakes is balanced so that the effects are generally shared equally among these lakes. Unbalancing provides benefits to the three listed species (on the intervening river reaches and around the rims of the lakes) and to young fish in the three lakes. A more detailed description of this plan component is presented earlier in this chapter.

6.3.4 Fort Peck Dam Flow Changes

Changes in the operation of Fort Peck Dam are included in the MCP. Increased releases up to 23 kcfs for 3 weeks from Fort Peck Dam in the mid-May through June time frame approximately every third year were modeled. The BiOp RPA recommended the 23 kcfs as a starting point, with a potential range of 20 to 25 kcfs. This change is recommended to ensure that operation of Fort Peck Dam does not jeopardize the continued existence of the endangered pallid sturgeon. The increased release would be split between the spillway (warmer water) and the powerhouse to trigger pallid sturgeon spawning by increasing both flow and temperature in the river reach downstream from the dam. Because this operation is done in conjunction with the intrasystem unbalancing, the terns and plovers benefit as do young fish in Fort Peck Lake and Lake Sakakawea.

6.3.5 Gavins Point Dam Flow Changes

The MCP does not include flow changes from Gavins Point Dam specifically benefiting the listed species. Instead, the modified releases in the spring and summer were modeled at the same flat release of 34.5 kcfs as the CWCP. Monitoring of native river species, particularly the endangered pallid sturgeon, would be accomplished to provide data for use in the adaptive management process. The Corps recognizes that there is an existing natural spring rise that occurs on the lower reaches of the Lower River. As part of the coordination between the USFWS and the Corps during the preparation of the BiOp, several analyses were developed to better understand how well the Lower River reaches were meeting the attributes required by the pallid sturgeon. These analyses were also used to provide some information in the RDEIS on how well the reach below Kansas City is meeting these attributes (see Chapter 7 discussion of the effects to fish). Since the MCP does not include the Gavins Point Dam flow changes, based on the BiOp RPA, it may not preclude jeopardy of the three listed species and the Corps would not be in compliance with the ESA.

There are two processes that could potentially allow the MCP to comply with the ESA. First, the Corps could re-initiate consultation with the USFWS under Section 7(a) of the ESA for the CWCP. The USFWS could potentially modify the BiOP RPA such that currently prescribed Gavins Point Dam flow changes in the RPA are not necessary to preclude jeopardy or it could construct an additional RPA that does not include the Gavins Point Dam release changes. The second process, found at 40 Code of Federal Regulations (CFR) Part 450, provides for an exemption under the ESA and is summarized below.

Summary of Exemption Process Under the ESA

The ESA and implementing regulations set forth an exemption procedure for an agency action, if after consultation under Section 7(a)(2) of the ESA, the Secretary's opinion indicates that the agency action would violate section 7(a)(2) of the ESA.

The regulations provide that an application for an exemption must be submitted to the Secretary of Interior (Secretary) within 90 days following the termination of the consultation process. A Federal agency, the Governor of the State in which an agency action will occur, if any, or a permit or license applicant may apply for the exemption.

When the exemption applicant is a Federal agency, the application information must include, but is not limited to, the following information:

- A comprehensive description of the proposed agency action;
- A description of the consultation process;
- A copy of the biological assessment and biological opinion;
- A description of each alternative to the proposed action considered by the agency;
- A statement describing why the proposed agency action cannot be altered or modified to avoid violating Section 7(a)(2) of the ESA; and
- A description of resources committed by the agency, if any, to the proposed action subsequent to the initiation of consultation.

Application requirements for permittees or licensees and Governors for the States in which the proposed agency action may occur are also separately set forth (see 50 CFR § 451.02 (e)(3) and (4)). All applicants must also submit the following:

- A complete statement of the nature and the extent of the benefits of the proposed action;
- A complete discussion of why the benefits of the proposed action clearly outweigh the benefits of each considered alternative course of action;
- A complete discussion of why none of the considered alternatives are reasonable and prudent;
- A complete statement explaining why the proposed action is in the public interest;
- A complete explanation of why the action is of regional or National significance; and
- A complete discussion of mitigation and enhancement measures proposed to be undertaken if an exemption is granted.

When the exemption applicant is a license or permit holder or a Governor, the exemption applicant shall provide a copy of the application at the time the application is filed to the Federal agency that denied the license or permit.

After the application is submitted, the Secretary shall review the contents and determine whether the application complies with the applicable regulatory requirements. If the Secretary finds the application meets the requirements, notice of the application for an exemption is provided to the Secretary of State and also published in the Federal Register. The Governors of each affected State are also notified and requested to recommend individuals to be appointed to the Endangered Species Committee (Committee) for consideration of the application. These recommendations are transmitted to the President by the Secretary, requesting that the President appoint a State resident to the Committee from each affected State. When no State is affected, the Secretary submits to the President a list of individuals with expertise relevant to the application requesting that the President appoint an individual to the Committee.

Within 20 days after the Secretary's receipt of the exemption application, Part 451 of the regulations requires the Secretary to conclude a threshold review and determinations. The Secretary must determine:

- Whether any required biological assessment was conducted;
- To the extent determinable, whether the Federal agency and license or permit applicant have refrained from making any irreversible or irretrievable commitment of resources; and
- Whether the Federal agency and permit or license applicant, if any, have carried out consultation responsibilities in good faith and have made a reasonable and responsible effort to develop and fairly consider modification of, or reasonable and prudent alternatives to, the proposed action that would not violate section 7(a)(2) of the Act.

If the Secretary makes a negative finding on any threshold determination, the application is denied. A positive finding requires the Secretary to notify the applicant that the application qualifies for consideration by the Endangered Species Committee. However, if the Secretary of State determines that granting an exemption and carrying out the proposed action would violate an international treaty obligation or other international obligation of the United States, the Secretary shall terminate the exemption process immediately.

If the Secretary makes a negative finding regarding the above issues, then the application is denied, and this constitutes the final agency action.

If the Secretary makes a positive finding on each of the threshold determinations, a report is then prepared for the Endangered Species Committee. The contents of the report are set forth at 50 CFR §

452.04 (a)(1) through (7). To develop a record for the report, the Secretary and the members of the Committee shall hold hearings to which an administrative law judge is assigned. Formal notice of the hearings is required. There are procedures for admitting and excluding evidence, raising objections, making motions, and submitting petitions. All hearings and hearing records are open to the public. Subpoenas may be issued. The parties shall consist of the exemption applicant, the Federal agency responsible for the agency action, the USFWS, and interveners, whose motion to intervene has been granted. After closing the record, the administrative law judge shall certify the record and transmit it to the Secretary of Interior for preparation of the Secretary's report, which shall be based on the record, and submit it to the Committee within 140 days of the threshold determinations.

Within 30 days of receiving the Secretary's report and record, the Committee shall grant an exemption if:

1. It determines that based on the report to the Secretary, and the record of the hearing that:
    - There are no reasonable and prudent alternatives to the proposed action;
    - The benefits of such action clearly outweigh the benefits of alternative courses of action consistent with conserving the species or its critical habitat, and such action is in the public interest;
    - The action is of regional or National significance; and
    - No irreversible or irretrievable commitment of resources has been made in violation of Section 7(d) of the Act.
2. It establishes reasonable mitigation and enhancement measures.

This determination requires that at least five members concur. The regulations provide for a written decision of the Committee and, unless determined otherwise by the Secretary, the exemption shall be permanent. The Committee can also decide to invite written submissions or to hold public hearings.

The Committee includes the following members: the Secretary of Agriculture; the Secretary of the Army; the Chairman of the Council of Economic Advisors; the Administrator of the Environmental Protection Agency; the Secretary of the Interior; and the Administrator of the National Oceanic and Atmospheric Administration. In addition, the President shall appoint one individual from each affected State (16 U.S.C. § 1536 (e)(3). Five members of the Committee shall constitute a quorum, only members of the Committee may cast votes, and the Committee members from the affected States shall collectively have one vote.

6.4 FEATURES OF THE FOUR GP OPTIONS

The MCP and the GP options are identical to one another, with the exception of changes in releases from Gavins Point Dam. The RPA in the BiOp recommends an increase in spring releases (the spring rise) and a decrease in summer releases (summer low flows). These flow changes are recommended to ensure that the Corps' operation of the Mainstem Reservoir System is not likely to jeopardize the continued existence of the three protected species. The GP options provide a potential starting point option, with flexibility for potential flow changes under adaptive management.

Under the GP options, the spring rise would occur on average once every 3 years between May 1 and June 15 (modeled May 15 to June 15), as conditions allow. The potential starting point for the spring rise under the GP alternatives is 15 kcfs above full navigation service releases, the lowest spring rise value of the two included in the GP options. The amount of the spring rise could be adjusted upward to 20 kcfs if monitoring and data analysis indicate this measure is recommended for the pallid sturgeon by the ACT under adaptive management. The rise is intended to provide a spawning cue for the species.

Summer flows would be lower every year as conditions allow under the GP options. The lower summer flows would expose more sandbar acres for tern and plover nesting and create shallow water habitat for young pallid sturgeon. The potential starting point for the lower summer releases from Gavins Point Dam would provide minimum service to Missouri River navigation (modeled as a 28.5-kcfs flat release but it would be variable under actual operations). Spring rise releases would initially be stepped down to provide minimum service to navigation (6 kcfs less than full service) by June 21. The lower releases would be held steady until September 1, when releases would

revert back to full navigation service or greater if necessary to evacuate excess water from the flood control zones in the system. Summer releases could be adjusted downward toward a combination of 25 kcfs from June 21 to July 15, followed by 21 kcfs to August 15, followed by 25 kcfs to September 1, if monitoring and data analyses indicate this is necessary for the species and the ACT recommends the change. These releases would normally not be adequate to provide even minimum service to navigation.

The potential starting point option for the changes in Gavins Point Dam releases is identified as GP1528. This option has the least amount of change from the CWCP, and, therefore, would be a logical starting point. The option with the highest spring rise and lowest summer release is GP2021. The GP1528 and GP2021 options represent the full range of NEPA coverage for the Gavins Point Dam release changes. Two other options, identified as GP2028 and GP1521, are also analyzed in this RDEIS so that readers can compare the impacts of specific changes resulting from a future higher spring rise only or a lower summer release only. Decisions to adjust potential changes to Gavins Point Dam releases within the range of these options could occur through the adaptive management and AOP processes.

6.5 OTHER ACTIVITIES FOLLOWING RECEIPT OF THE USFWS BIOLOGICAL OPINION

In addition to formulation of the alternatives for detailed presentation in the RDEIS, several events have taken place and issues have arisen since receipt of the BiOp in November 2000. While many of these events and issues do not relate directly to the Corps' analysis of the effects of the alternatives, which is presented in Chapter 7, in some cases these events and issues led to additional analyses of the alternatives. The more significant of these events are discussed here to provide background.

6.5.1 Implementation of the USFWS Biological Opinion

In accordance with 50 CFR Part 402.15, entitled "Responsibility of Federal Agency Following Issuance of a Biological Opinion," the Corps is required to inform the USFWS as to how the Corps intends to implement the BiOp RPA. Considerable discussions between the two agencies focused on the Corps' development of a comprehensive plan that meets the objectives of the RPA. While the RDEIS focuses on one aspect of this comprehensive plan—changes in flow management—a response is concurrently being prepared by the Corps and may follow the release of this RDEIS. The response addresses how the Corps intends to implement all elements of the RPA for three projects (Mainstem Reservoir System operations, operation and maintenance of the downstream Bank Stabilization and Navigation Project, and operation of the Kansas River projects). It also includes a discussion of the Corps' intent to pursue NEPA compliance for the Fort Peck and Gavins Point Dam release changes through this Study's NEPA process.

6.5.2 Navigation

An intensive legal, technical, and economic review of the Corps' responsibility to serve authorized project purposes was also undertaken following the receipt of the USFWS BiOp. In particular, the impact of the recommended low summer releases from Gavins Point Dam on Missouri River navigation has been and continues to be evaluated. This RDEIS presents the results of the analysis of two potential outcomes resulting from the two GP options that include the lower summer release from Gavins Point Dam (GP1521 and GP2021). These two outcomes are:

- Navigation will continue to be viable before and after the low-flow period, or
- Navigation will be reduced to sand and gravel mining and the movement and placement of waterway materials.

The Corps believes that the economic benefits presented for the two potential outcomes represent the full range of potential economic impacts to Missouri River navigation. However, the Corps is currently working with the Tennessee Valley Authority (TVA) to further examine the economic feasibility of Missouri River navigation under these two GP options. The results of the TVA/Corps analysis will be presented in the FEIS.

6.5.3 Power

Following receipt of the BiOp, the Corps was concerned about the impacts of low summer releases from Gavins Point Dam included in the RPA on power capacity and generation. Upper basin Congressional interests and the Midwest Electrical Consumers Association echoed this

concern. In March 2001, the Western Area Power Administration (WAPA), the Federal entity that markets hydropower generated by the Mainstem Reservoir System, requested to be an official cooperating agency for the NEPA effort. In April 2001 the Corps granted the WAPA request. Subsequently, the power analysis for the CWCP, MCP, and four GP options included the following analyses:

- Potential impacts to WAPA firm power customers;
- Regional power supply risk analysis;
- Review of the hydropower National Economic Development (NED) Analysis; and
- Review of the thermal power NED analysis.

The first three analyses were completed in time to be incorporated into Chapter 7. Review of the thermal power NED analysis was not completed because of the relatively small change that resulted from the hydropower NED analysis and the fact that the revised hydropower analysis did not change the relative differences among the alternatives. Any differences in the relative effects were very minor—much less than 1 percent different—when the results of the old and new analyses were compared.

6.5.4 Mississippi River Concerns

Throughout the preparation of this RDEIS, the Northwestern Division of the Corps has coordinated intensively with the Mississippi Valley Division (MVD) of the Corps to ensure that any impacts to Mississippi River resources resulting from the Corps' operation of the Missouri River are identified and analyzed. Two areas of concern were identified by MVD and are included in the analysis of the MCP and four GP options that is discussed in Chapter 7. In April 1999, MVD received a BiOp from the USFWS for the Operation and Maintenance of the Upper Mississippi River. That BiOp recommended that MVD monitor shallow water habitat as part of the operation and maintenance of the Upper Mississippi River to ensure the continued existence of the pallid sturgeon. That BiOp's RPA also restricted the period that the Corps could dredge the Middle Mississippi River reach. MVD staff were concerned that lower summer releases from Gavins Point Dam would either increase the need for dredging or require earlier dredging to occur within the restricted period in order to allow navigation to continue to move through the Middle Mississippi River reach. Enough of the analyses of both issues was completed that either partial (shallow water habitat) or final results (dredging) are presented in Chapter 7.

6.5.5 Depletions

The State of Missouri is concerned that substantial future depletions of Missouri River water may have different effects, depending on the selected plan. In order to address this concern, potential future Missouri River depletions ranging from 0.8 to 3.2 MAF are included in the analysis of two of the GP options (GP1528 and GP2021), and the results are presented in Chapter 7.

6.5.6 Uncertainties Associated with RDEIS Analyses

Throughout the Study, questions have arisen regarding the uncertainties associated with the many models used by the Corps to analyze the impacts associated with the alternatives. While the reader is referred to the supporting technical documents for a detailed discussion of the models, the following general discussion is intended to provide general insight into the modeling uncertainties.

Numerous models were developed to facilitate the analysis of alternatives to the CWCP for the Missouri River Mainstem Reservoir System. As the Corps began to set up the various impacts models and to modify the hydrologic model of the Mainstem Reservoir System, an effort was undertaken to gain acceptance of the models and, subsequently, their results. This discussion provides an overview of the process that was initially established to gain acceptance. It also addresses how uncertainty has been, and will continue to be, addressed in the EIS documentation.

Shortly after the Study began, the basin Governors established the Governors' Oversight Committee (which eventually dissolved and was replaced by the MRBA, which was not active when the study began). This committee met with Corps staff periodically to review study progress. As the models were developed and required more technical overview than could be provided by the committee directly, four subcommittees were established by the committee to oversee development of all of the models. The four subcommittees were identified as the Hydrology/Modeling, Low Flows/Water

Quality, Environmental, and Economics Technical Subcommittees. These subcommittees were made up of technical staff from Federal and State agencies throughout the basin. Corps staff worked with the appropriate technical subcommittee as each model was developed. Subcommittee members did not completely endorse every aspect of the final models used prior to 1994. The members were given the opportunity, however, to raise issues and concerns about each model and thoroughly discuss the issues with the Corps team and other subcommittee members. These subcommittees did not reform after the Draft EIS was circulated for comments and public hearings were held, even though new models were developed and some models were modified.

Expression of the level of uncertainty was not an issue when the models were developed. Establishing some sort of uncertainty factor at this time is impossible. Those more technically involved with the study understood that the models were developed to understand the relative differences among the alternatives. Environmental Impact Statements generally focus on expressing impacts in relative terms, not absolute terms. Early versions of EISs, in fact, tended to express impacts in terms of plusses and minuses.

The uncertainty associated with the various Study models is difficult to quantify. For some of the environmental resource models, quantification of the specific resource of concern was not possible. A related resource was, instead, modeled to try to understand the effect of changes in system operations on the specific resource of concern. For example, a model could not be developed to identify changes in the populations or the fledge ratios of the least tern and piping plover, two endangered or threatened bird species that nest on islands and sandbars in the river or along the shores of the mainstem lakes. A model could be developed, however, that addressed changes in clear sand habitat for the river reaches, which are the primary locations that nesting had occurred since the lakes were all first filled in 1967. During the development of the model, it became apparent that not all of the processes affecting the creation, maintenance, and loss of this habitat could be quantified and incorporated into the model. No relationship has been quantified for the geomorphic aspects of sandbar formation and destruction. This required the acceptance of a basic assumption. The factor that most significantly affects the geomorphic processes was essentially the same among the alternatives, i.e., relatively high flows for an extended period of time. These high flows of adequate duration occur fairly consistently among all of the alternatives modeled as they generally occur in the higher runoff years in the upper basin. The model, therefore, can provide some insight as to the relative differences among the many alternatives because it is responsive to the river flows that vary among the alternatives, and it is representative of the relative effects of the alternatives on the two bird species.

Similar discussions can be presented for each of the models used in the study. In some cases, the size of the area being studied and relative complexity of the models limited the analyses to representative sites or conversion of complex model results to regression relationships. The common thread through the models is that they had river flow, lake level, or both as parameters versus which an economic use benefit or an environmental resource value is identified. This allowed the computation of numeric values for all of the uses and resources being analyzed. All of the models were developed on the best available information at the time. In fact, considerable effort was expended on obtaining the best available information. All of the models have withstood the test of various levels of review. Some models have more or less value, and this value varies among all the myriad of interests having some level of oversight on the Corps' conduct of the Study.

6.5.7 Considerations for Development of An Adaptive Management Strategy for Restoration of the Missouri River Ecosystem

Introduction

As indicated in the discussion under Section 6.2 of this Chapter, the Corps considers an adaptive management strategy to be an integral component of all of the alternatives presented in detail in Chapter 7. As discussed, an ACT, made up primarily of Federal biologists, has been established to facilitate the adaptive management approach to Mainstem Reservoir System operation. The following discussion is provided to present a more informed discussion of the concept of adaptive management as it relates to ecosystem recovery. This discussion is academic in nature and is intended to stimulate thought and discussion of an

adaptive management strategy for restoration of the Missouri River ecosystem.

As is the case for many aquatic ecosystems across the Nation, discussions of an adaptive management strategy for the Missouri River ecosystem have stemmed from conflicts in water resources management. While there is an overall National and regional Tribal and public interest in restoring the Missouri River ecosystem, changes in the Corps of Engineers operation of the system for threatened and endangered species have been the impetus for an adaptive management strategy for the recovery of the Missouri River ecosystem. The challenge before the basin at this time is to more fully understand the concept of adaptive management and to develop ecological goals and institutional structures and processes that allow for effective ecosystem recovery.

The discussion below focuses on general concepts underlying effective adaptive management strategies for ecosystem recovery, adaptive management as a component of the alternatives, and adaptive management focused on threatened and endangered species recovery. While models and implementation of adaptive management for a number of watersheds have been considered and the successes and failures of those efforts serve as a valuable learning tool, it is clear that an adaptive management strategy that encompasses the geographic, social, economic, and political scope and diversity of the Missouri River ecosystem has never been undertaken.

In reviewing the discussion below, it is important to remember that, while the focus of this RDEIS is the Corps' operation of the Mainstem Reservoir System, an adaptive management strategy that considers restoration of the Missouri River ecosystem as an integrated whole transcends the Corps' existing authorities and expertise. While system operations significantly affect the Missouri River ecosystem, they are only a part of the components to be addressed in a larger ecosystem restoration strategy.

Definitions

Adaptive management is an overall strategy for dealing with change and scientific uncertainty. The strategy promotes an environment for testing hypotheses and exploring promising techniques based on monitoring and subsequent scientific analyses. Under adaptive management, ecosystem restoration is not locked in place. Rather, the flexibility to adapt as a situation unfolds and new information is available is inherent. The Missouri River ecosystem includes the complex of the Missouri River community and its environment, functioning as an ecological unit in nature. Adaptive management embraces the interrelatedness of environmental, economic, social, and political issues and integrates those considerations into a process.

From the Corps' perspective, the Missouri River ecosystem is viewed hydrologically as including the Missouri River mainstem and the entire drainage area of the Missouri River. That area is depicted in Figure 1.1-1 in Chapter 1. Identifying a defined geographic area for a Missouri River adaptive management strategy is not intended to suggest that Missouri River ecosystem restoration be viewed in isolation. For example, since the Missouri River flows into the Mississippi River, impacts of Missouri River actions on the Mississippi River ecosystem must also be considered.

Principles

1. Development and implementation of an effective adaptive management strategy for the Missouri River ecosystem will require the commitment of the Nation, 30 basin Tribes, 10 basin States, numerous local governments, and countless private entities, and the collective will of basin citizens for decades to come. Effective implementation of adaptive management must be continuous. Even short-term starts and stops in the process could disproportionately affect progress toward recovery. The process must have a long-term vision and long-term goals. Without long-term commitment, those goals cannot be achieved. While financial reliability is the lifeblood of effective restoration**,** commitment to the approach itself is more fundamental to success. Incentives must be incorporated into the strategy that sustain long-term commitment. Commitment must be reflected legislatively. Figure 6.5-1 identifies critical elements of the legislative proposal for (San Francisco) Bay-Delta Ecosystem Restoration and may provide some insight relative to legislative content.

2. The key to a successful adaptive management strategy is development of a coherent, comprehensive approach that focuses on achieving results on the ground. Spending and process should not be emphasized over ensuring ecosystem results. Rivers and streams, wetlands, and fish and wildlife species

are indifferent to how much money is spent and how many meetings are held. Ecological objectives, measurable indicators of progress, schedules for implementing actions, and accountability must be established.

3. The adaptive management strategy itself is also subject to adaptive management. The most solid restoration plan cannot be accomplished without an equally effective institutional framework. An original concept of scope, governance, and structure may prove ineffective. Adaptive management should be viewed as a work in progress, and the basin must be open to departures from the original concept. Current governmental institutions may not have missions and expertise consistent with the ecosystem recovery strategy, or they may not have the necessary authorities, resources, or mandates.

4. Clear short- and long-term goals and objectives must be established. Attainable restoration goals that achieve some basic level of ecological health have broad public and political support in the Basin and should be pursued. These goals and objectives must be established with the knowledge that the Missouri River ecosystem is well beyond returning to its pre-development condition.

   There must be a demonstrable and measurable link between actions and achievement of objectives and goals. This is oftentimes established by development of plans. Comprehensive plans provide the necessary focus for attaining goals.

   Environmental, economic, social, and political considerations must be integrated into the development of the goals and objectives. In order to be committed to the goals, stakeholders must be involved in establishing them.

   While near-term objectives may be more readily developed and understood, the process should establish long-term goals that may be modified as more information is available. Long-term goals provide the vision for ultimate recovery.

5. Adaptive management decisions should be based on the best scientific information available. The adaptive management process establishes, directs, and prioritizes development of both core research, on-going research, and monitoring and evaluation of specific parameters and actions. Both empirical and actual data are the foundation upon which actions are developed and subsequently modified.

   Public confidence in the efficacy of adaptive management decisions is directly related to the willingness of the public to fund adaptive management efforts. "Good science" cannot be allowed to become a euphemism by basin stakeholders to mean partisan science, and disputes over science cannot be allowed to undermine and paralyze decision making and progress. Minimization of research bias is critical. Routine independent scientific review must be incorporated into the process and be readily available to stakeholders.

6. Agency regulations and policies must be treated as experiments that are subject to change. This applies to both existing and future regulations and policies. Actions that are not addressed by regulation or appear to be prohibited by regulation should not be discounted. The adaptive management process may establish the need to change or eliminate particular regulations or policies. Frequent review of laws, regulations, and policies should be incorporated in the process.

7. Strong leadership is essential to achieving consensus and minimizing decisions based on advocacy rather than the priorities established by the adaptive management process. In order to centralize overall leadership and management responsibility and accountability, it may be desirable to have an independent entity manage the entire effort. This approach has been found to be successful in other basins. Governmental entities with specific mandates and cultures may not have the independence and objectivity necessary for effective leadership of the effort.

8. The ecosystem must be considered as a whole. In the case of the Missouri River, due to geographic extent and ecosystem diversity, there will likely be focused groups or sub-elements specific to one issue or geographic area. A framework must be developed which links smaller groups to the larger group and overall strategy.

Adaptive Management Strategy Directed Toward Missouri River Ecosystem Recovery as Compared to Adaptive Management Directed Toward Recovery of Threatened and Endangered Species

Arguably, a case can be made that listed species are in the most imminent danger and should have highest priority, even in an adaptive management strategy that considers the entire ecosystem. Further, many actions that may benefit listed species will likely benefit many native species and the ecosystem as a whole. A limited menu of actions that focuses narrowly on listed species may discount multiple parameters important from an ecosystem recovery perspective. Ecosystem-based actions may be different or of a higher priority than those necessary to preclude jeopardy to, or eventually recover, listed species. Further, compliance with the ESA relative to Missouri River operations is the legal responsibility of the Corps and is not binding on other basin stakeholders. Participation based on ESA compliance and eventual recovery may or may not have the stakeholder commitment that an ecosystem-focused adaptive management strategy may have. The basin must determine how resolution of the threatened and endangered species issue fits into an adaptive management strategy focused on ecosystem restoration. While the basin may choose to pursue an adaptive management strategy more narrowly focused on listed species, a review of other case studies would indicate that such efforts quickly evolve to more encompassing strategies.

The ESA also raises questions of authority, scope, structure, and governance for any adaptive management strategy. Since Federal agencies do not abrogate their responsibilities and authorities under ESA, it is unlikely that an adaptive management process that includes basin stakeholders would be allowed to redefine the jeopardy thresholds established by the USFWS or negate prescribed measures included in the RPA. This conflicts with the basic principle that stakeholders should participate in the development of goals and objectives. The USFWS may want to consider allowing stakeholder participation in defining jeopardy thresholds rather than allowing stakeholders to participate in a solely advisory role focused on species recovery. There may be decisions relative to thresholds and recovery of the listed species where stakeholders could have a decision-making role. Certainly, where specific statutory responsibilities are lacking, stakeholders may have more than an advisory role.

Where Does the Basin Go from Here?

Development of an initial institutional framework necessary for effective adaptive management implementation for recovery of the Missouri River ecosystem will require considerable deliberation. At this time, the MRBA has assumed a leadership role in the development of an adaptive management strategy. The MRBA conference that was held in May 2001 focused specifically on development of an adaptive management strategy to address recovery of listed species. Citizens throughout the basin provided valuable input into the scope and governance of adaptive management. The MRBA is currently evaluating the input provided as well as reviewing models of National ecosystem restoration efforts.

Conceptually, the Corps of Engineers embraces the concept of an adaptive management strategy for recovery of the Missouri River ecosystem. If the basin were to commit to such a strategy, the Corps looks forward to any role it may have in catalyzing this effort.

A Legislative Proposal for Bay-Delta Ecosystem Restoration

1. **Establish a Mandate:** It is critical to provide clear direction to the agencies that they are required to restore and protect ecosystem health.
2. **Require Consistency:** Legislation must ensure that development and operations affecting the ecosystem are compatible with restoration objectives.
3. **Guarantee Water:** The institutional structure must be able to secure water for the natural system sufficient to accomplish the restoration mandate.
4. **Provide Money:** There must be a secure and long-term commitment to funding restoration that is resistant to undue politicization of technical decision-making.
5. **Demand Performance:** Measurable performance expectations are essential, as well as a blueprint showing how and when restoration objectives will be achieved.
6. **Build in Science:** Independent scientific inputs, isolated from partisanship, must be part of the program.
7. **Forge Governmental Partnerships:** The federal/state relationship can be fostered by establishing benefits and incentives for full partnership on each side.
8. **Focus Responsibility:** Management of the restoration initiative must be assigned to an identified entity, with the appropriate expertise, commitment, and authority to do the job.
9. **Foster Agency Parity:** The institutional structure must provide a truly balanced forum for building cooperation among agencies and a specific process for resolving disputes.
10. **Engage Stakeholders:** The institutional structure must be made sufficiently attractive to stakeholders to secure their buy-in, without giving it over to them.
11. **Ensure Accountability:** The institutions must demonstrate how and where money is spent as well as progress in achieving restoration goals. Legal consequences for nonperformance must be clear.
12. **Establish Links:** Benefits for other system users must be tied to achievement of restoration outcomes—not merely process—to ensure sustained political support for restoration and to provide incentives for success.

Source: Koehler, 2001

Figure 6.5-1. A legislative proposal for bay-delta ecosystem restoration.

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